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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/442,499 11/18/99 HO

K CS99-065

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IM62/1211

EXAMINER

GOUDREAU, G

ART UNIT

PAPER NUMBER

1763

DATE MAILED:

12/11/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.

09-442,499

Applicant(s)

Ho et al

Examiner

George Goudreau

Group Art Unit

1763

--The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address--

## Period for Response

A SHORTENED STATUTORY PERIOD FOR RESPONSE IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a response be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for response is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to respond within the set or extended period for response will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

## Status

- ☒ Responsive to communication(s) filed on (11-99' to 1-00') (ie, - papers #1-2)
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 1-16 is/are pending in the application.
- Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☒ Claim(s) 1-16 is/are rejected.
- ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

- ☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been
- ☐ received.
- ☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.
- ☐ received in this national stage application from the International Bureau (PCT Rule 1.7.2(a)).

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2
- ☐ Interview Summary, PTO-413
- ☒ Notice of References Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☒ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other \_\_\_\_\_

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15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

18. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soga et. al. (6,090,718).

Soga et. al. disclose a process for rie etching a trench in a Si wafer (2) using a SiO<sub>2</sub> hard mask (1); and a plasma comprised of (HBr-SiF<sub>4</sub>-SF<sub>6</sub>-O<sub>2</sub>). The rie etching chamber is cleaned

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after each wafer is rie etched before processing additional wafers through the rie etcher. The rie etcher is cleaned using a cleaning/seasoning/purge process. The interior surfaces of the rie etcher are cleaned by placing a dummy Si/SiO<sub>2</sub> wafer in the rie etcher; and discharging an SF<sub>6</sub> gas. This cleaning step removes etch by products left from prior rie etching steps on the interior surfaces of the rie etching apparatus as well as the seasoning layer which was deposited onto the interior surfaces of the rie etching apparatus. The interior surfaces of the rie etcher are then seasoned by discharging a plasma comprised of (HBr-SiF<sub>4</sub>-SF<sub>6</sub>-O<sub>2</sub>) in the presence of a dummy Si/SiO<sub>2</sub> wafer. The rie etcher is then purged of process gasses prior to processing additional wafers through the rie etcher. The 2nd wafer is then rie etch in the rie etcher. The cleaning process disclosed above is then repeated. The Si wafer is etched in the formation of microelectronics. This is discussed specifically in columns 4-12; and discussed in general in columns 1-18. This is shown in figures 2-19. Soga et. al. fail, however, to specifically disclose the following aspects of the applicant's claimed invention:

- the specific formation of seasoning films on the interior surfaces of the rie etching apparatus with the specific composition which are claimed by the applicant; and
- the specific dry etching of a polysi layer or a cz-Si layer on a wafer in a plasma comprised of compounds capable of generating free Br or Cl

It would have been inherent that the Si wafer in which the trench is etched in the process taught above is comprised of cz-Si since the Si wafers which are used to form semiconductors

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are made of cz-Si. The examiner cites the case law listed below of interest to the applicant in this regard.

In re Swinehart (169 U.S.P.Q. 226 (CCPA )) and In re Best (195 U.S.P.Q. 430 (CCPA )) state that when an examiner has reasonable basis for believing that functional characteristics asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be inherent characteristics of the prior art, the examiner possesses the authority to require an applicant to prove that the subject matter shown to be in the prior art does not possess the characteristics relied upon.

It would have been inherent that a polymeric film comprised of at least Br-Si-O would have formed on the interior surfaces of the rie etcher in the process taught above based upon the following. A dummy wafer is rie etcher in the presence of a plasma comprised of free F, Br, O, Si during the seasoning step which would have been expected to have formed films on the interior surfaces of the rie etcher which are comprised of any combination of these elements during the seasoning step. This would have included films comprised of Si-Br-O, and Si-Br as well as other types of films. The examiner cites In re Swinehart of interest to the applicant in this regard.

It would have been obvious to one skilled in the art to employ the rie etching process taught above to rie etch either a polysi film or a cz-Si film on a Si wafer based upon the following. The rie etching of polysi films, and cz-Si films on a Si wafer is conventional or at least well known in the semiconductor processing arts. (The examiner takes official notice in this regard.) Further, the rie etching process taught above would have been expected to have been suitable for rie

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etching a polysi film on a wafer since it is taught as being suitable for etching another type of Si compound (i.e.-cz-Si) whose chemical reactivity should have been very similar to that of the polysi.

19. Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

-The last paragraph of claims 1, 7, and 12 are written in a confusing manner; and should be rewritten. (It is unclear to the examiner whether applicant intends to claim that a cleaning/seasoning process sequence is conducted between the plasma etching of each wafer.)

20. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

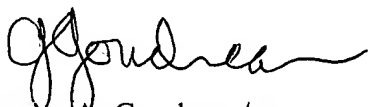
21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A. Goudreau whose telephone number is (703) -308-1915. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) -308-3599.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.

A handwritten signature in cursive script, appearing to read "Goudreau", with a long horizontal flourish extending to the right.

George A. Goudreau/gag

Examiner AU 1763